THE

GREEN MOUNTAIN REPOSITORY.

VOL. I. BURLINGTON, DECEMBER, 1832. NO. 12.

For the Green Mountain Repository.

THE PRODUCTION AND PROPAGATION OF SOUND.

Sound is a peculiar motion or vibration, arising from the collision of elastic bodies, which produces the sensation of hearing. The vibrations of the elastic body produce similar vibrations in the atmosphere, or other medium, which conveys them to the ear. Hence, three things are requisite in order that we should have any idea of the existence of sound; namely; an elastic body to commence the vibrations a medium to convey them, and an ear, or organ of hearing, to receive them. Should either of these be wanting, it would be utterly impossible to form any correct notion of sound.

The quantity and quality of the sound, depend upon the density and elasticity of the sonorous body, the force of percussion, by which the vibrations are produced, and the density and elasticity of the conducting medium. Water as well as air is a medium of sound, and sound is propagated in it to a great distance. But as air is the medium in which sound is usually conveyed, we, shall consider it with reference to that medium. That the quantity of sound depends upon the density of the air, is evident from the following fact. Let a bell be struck in a vacuum, and no sound is heard; but, as the air is admitted, a sound will be heard, and will continue to increase, with the same percussion, in proportion to the density of the air admitted.

The atmosphere decreases in density in proportion to its elevation. Now as the strength of sound depends upon the density of the atmosphere, it is plain that the same collision will produce a stronger sound, and will be heard at a greater distance, in a low, than in an elevated country. Hence the absurdity, so common, of elevating bells to a great height, in order that they may be the further and the better heard. The truth is, in a country where there are no hills, or other objects, to interrupt the sound, bells should be placed either on, or below the medium height of those who are to be benefitted by their music.

The audibility of sound decreases nearly in proportion as the squares of the distance from the point of collision increase. Or more familiarly, sound moves from the sonorous body in a manner nearly similar to those circular waves occasioned by casting a stone into a pool of still water, with this difference, that sound moves in every other direction as well as laterally. The percussion of the stone repels those particles of the fluid which meet its surface. These in their turn repel those particles which lie contiguous, and thus produce waves, which decrease in height in proportion as the length of their circumference increases. In like manner, when an elastic body is put into a tremulous motion, the air, which is contained in the pores of the body, and that which presses upon its surface, is put into similar agitations. The agitation of these particles, repels those particles which lie contiguous, and thus propagate the tremors of the sonorous body to the surrounding atmosphere. These tremors will continue to spread in every direction, being gradually diminished by the communication of motion to fresh particles of air, until the vibrations entirely cease.

Thus is sound conveyed from sonorous bodies, to the organ of hearing. Every vibration of an elastic body communicates a similar vibration to the adjacent air. If these vibrations are successively propagated until they reach the organ of hearing, and strike upon the drum of the ear with sufficient force to agitate the included air, similar vibrations will be produced in that, which, affecting the auditory nerve, will produce in the mind the sensation of hearing. The greatest distance, of which we have any account that sound has been heard, is about 200 miles. This was observed at the time of an engagement between the Dutch and

English, in the year 1672. At the time of the battle of Bunker Hill,* in the commencement of the American revolution, the firing was distinctly heard in Barnard, Vermont, a distance of more than 100 miles. In the latter case the sound passed over land, in the former over water.

Sound moves at the rate of 1130 feet in a second of time. This velocity may probably be a little accelerated or impeded by winds or the influence of heat; but their effect is scarcely perceptible. It is likewise ascertained that the celerity of sound is the same, whether it be loud or soft, sharp or dull. The sound of the tremendous bells of Moscow, or the discharge of the heaviest artillery, travels no faster than that of the tinkling sheep-bell, or the softest whisper. The motion of sound is also found to equable from the point of collision to the utmost limits of its extent; that is, the motion of sound is uniform in every part of the space through which it passes. Hence the distance of thunder, or a cannon may be estimated by observing the time which elapses between the flash and report; for if the seconds, which intervene, be multiplied by 1130, the product will be the distance in feet. Or the distance may be determined, very nearly by the pulsations at the wrist. In a person of good health, the pulse repeats 75 times a minute. Hence in 75 pulsations, sound moves through the distance of about 13 miles, or one mile in six pulsations

It is observed that the same sound is heard more distinctly, and at a greater distance in the night, than in the day time. But the causes are very apparent. The air is usually heavier in the night, because less rarified by the sun's rays. The air too, is generally less agitated by the winds, and a less variety of sounds prevail to distract the attention and confuse the ideas in the mind. When one, or more, of the organs of sense, is suspended, those which continue their office, are found to be more communicative of ideas to the mind, and far more minute in their communications, than when all the faculties are in exertion. In the night the faculty of vision is nearly suspended, on account of the absence of light. Hence the faculty of hearing becomes more acute and comprehensive.

The modifications of sound are infinite; and the number of tones, the human ear is capable of distinguishing, is truly wonderful. Some of the most agreeable sounds are those which proceed

* June 17th, 1775.

from musical instruments. Of these we shall notice the Æolian Harp. The strings of this instrument are of great tenuity, and, being arranged much after the manner of those of the viol, are put into a vibratory motion by the wind. It received the name Æolian Harp, from Æolus, the god of the winds, among the ancients. But of all sounds, the human voice is the most agreeable and useful. The faculty of speech, is one of the most valuable endowments which the Creator has bestowed upon man, and a distinguishing characteristic of the dignity of his station. The human voice is formed by the air, which is expelled from the lungs, through the larynx or upper end of the windpipe. There is a small opening, nearly in the middle of the larynx, called the glottis, through which the air is driven with great force. The air, in its passage through the glottis, agitates the larynx and puts it into a tremulous motion. From these tremors a sound arises, which, being modified, in its passage through the mouth, by organs peculiarly adapted to that purpose, comes to the ear in all that pleasing variety of articulate sounds.

Detonation is the sound produced by the instantaneous production, or destruction of an elastic fluid. When a solid is instantaneously converted into an elastic fluid, it will produce an agitation in the atmosphere, because the fluid will occupy a larger space than the solid previously did. So on the other hand, when an elastic fluid is suddenly converted into a solid, or liquid, the air will rush together in the vacuum, and produce a report. Gunpowder is probably the happiest illustration of the former case, while hydrogen gas affords a striking example of the latter. Gunpowder is composed of six parts of nitre, one of charcoal, and one of sulpher. When powder is ignited, the parts of which it is composed, form a variety of new combinations among themselves and with the atmosphere, and are instantaneously converted into a variety of gases, whose sudden expansion occasions the detonation. The combustion of hydrogen gas produces water; and as the space occupied by the water, is trifling, compared with that, which the gas before filled, a considerable vacuum will be produced into which the air will rush with sufficient force to occasion a loud report. If a large soap bubble be blown up with hydrogen gas, on touching fire to it the detonation will be nearly as loud as the report of a pistol.

It frequently happens that the vibrations, which are propagated in the atmosphere in all directions, meet with objects from which they are reflected with sufficient force to occasion a reppetition of the sound, which is called an *echo.* When sound meets with objects at different distances, capable of reflecting it, it may be repeated several times, the echo from the nearest object being heard first, and the rest in succession according to their respective distances. Attention to the phenomenon of echoes is often very serviceable, especially to people who are boating on rivers. In descending the Ohio, the boatmen are often deceived by a falsity of vision, occasioned by the fogs and mists; and sometimes think the shore to be near when they are at a great distance from it, and, at other times, supposing themselves to be remote from the shore, are upon it before they are aware. The nearest shore and its distance may be ascertained, generally, by making some kind of noise, for there is usually an echo, which is always heard from the nearest shore first.

The preceding remarks relate to the propagation of sound in the atmosphere, but it has been ascertained that different bodies conduct it with different velocities. This is illustrated by an experiment made by Biot at Paris. At the extremity of a cylindrical tube upwards of 3000 feet long, a ring of metal was placed, of the same diamater as the aperture of the tube; and in the centre of this ring in the mouth of the tube was suspended a clock bell and hammer. The hammer was made to strike the ring and bell at the same time; so that the sound of the ring would be transmitted to the remote end of the tube through the conducting power of the matter of the tube itself; while the sound of the bell was transmitted by means of the air within the tube. To an ear placed at the opposite end the sound of both were heard, but the sound of the ring was heard sometime before that of the bell. By several careful experiments with this apparatus, it was found that the metal of the tube transmitted sound with a velocity about ten times as great as the air within the tube; that is at the rate of about 11,865 feet per second.

For the Green Mountain Repository.

REMARKS UPON THE DIRECTION AND USE OF THE MAGNETIC NEEDLE.

(Continued from page 259.)

The consequence is that surveyers are appointed who have no knowledge of geometry, trigonometry or mensuration, and that in all cases of lands bounding on waters, and where they consist of many sides of different lengths, such men, with such instruments as they usually possess, would not generally approach so near the truth as to help a guess.

Lands have now become valuable and are becoming more so, and instances are daily occuring where the difference between the estimated quantity by surveys made in the usual way, and the real quantity by a true estimate would amount to more than enough to purchase a good set of instruments; and cases are not wanting where the difference in a single case would amount to sufficient to furnish the said instruments, and educate a young man for the business of surveying.

Another evil, which arises from the want of a proper knowledge of the business is, that many, who are either totally ignorant, or have a very imperfect knowledge of surveys, in attempting to make descriptions in deeds and otherwise, make them so imperfect and in many cases erroneous, tha they become fruitful sources of law-suits.

Many deeds are taken from surveys long since made, and the courses given as in the original survey, when the variation of the needle during the elapsed time between the making of the survey, and the deed, may have occasioned a difference of variation of two or three degrees. And agreeable to our present mode of doing business, deeds should be governed by surveys made at the time of their date.

This in many instances would make it quite different from the intention of the parties, and he who happens to have the advantage is generally much disposed to hold it. One case which is of this kind and of great consequence, is now within my knowledge.

When we view these evils as they first arise before the consequences begin to follow, we view them as of minor consideration. But as time rolls on they become the seeds of the most inveterate law-suits known to our courts of justice.

Having pointed out a few only of the many defects in our present and past method of doing this business, I next proceed to state what I consider would operate in some degree to correct the existing evil. I say, in some degree, for it is an evil which can only be remedied by slow degrees, and which may never receive a final cure.

The method I propose is that the surveyor general be selected from among those known to be fully competent. To be furnished at the expense of the state with suitable instruments.

A sufficient number of deputy surveyors to be appointed in each county, who as a prerequisite shall pass a good examination in Geometry, Trigonomitry, Mensuration, Rutangular Surveying, and the application to practice of all the rules required in land surveying. They shall also be capable of drawing and making maps of surveys in good style, and regular and proper descriptions of all surveys in proper and appropriate language. They shall provide themselves with good and correct instruments which shall also be subject to examination, and they shall be approved by the county court for the county in which they reside, as of good moral character and regular habits.

In one or more places in each county a meridian should be made by true celestial observations, and perpetuated by suitable permanent monuments. Each compass used in surveying should be rectified to the true meridian in the county where it is used, or the difference between the true and magnetic meridian carefully observed and noted once at least in each year, and the variation so found, noted in all surveys and descriptions in deeds throughout this state.

All surveys made in this way can always be traced with certainty at any time hereafter, because the angle from the meridian will always be known, and can be determined with equal ease whatever may be the difference of variation.

The expense to the state in purchasing instruments and forming meridians would be much less than has been paid in a single lawsuit which has grown out of the want of such regulations.

Should an arrangement of this kind take place it would induce a sufficient number of young men to prepare themselves for the business, and surveys officially made after such an organization shall have been effected, will be entitled to, and receive the public

confidence; instead of which, as it now is, surveys pretended to be official are frequently nothing more than official impositions.

Many other advantages will arise without any expense to the state. The same theories which are applicable to land surveying, form the basis of many of the most important mechanical professions, and extend to all the principles of engineering; and I might further add, their usefulness extends to all the business of life.

It would also give a favorable impulse to schools because theories would be followed up to their practical utility, and the student would realize the value of his studies.

From the Library of Useful Knowledge.

PLEASURES OF SCIENCE.

Reflect how many parts of the reading, even of persons ignorant of all sciences, refer to matters wholly unconnected with any interest or advantage to be derived from the knowledge acquired. Every one is amused with reading a story: a romance may please some, and a fairy tale may entertain others; but no benefit beyond the amusement is derived from this source: the imagination is gratified; and we willingly spend a good deal of time and a little money in this gratification, rather than in rest after fatigue, or in any other bodily indulgence. So we read a newspaper, without any view to the advantage we are to gain from learning the news, but because it interests and amuses us to know what is passing. One object, no doubt, is to become acquainted with matters relating to the welfare of the country; but we read the occurrences which do little or not at all regard the public interests, and we take a pleasure in reading them. Accidents, adventures, anecdotes, crimes, and a variety of other things amuse us, independent of the information respecting public affairs, in which we feel interested as citizens of the state, or as members of a particular body. It is of little importance to inquire how and why these things excite our attention, and wherefore the reading about them is a pleasure: the fact is certain; and it proves clearly that there is a positive enjoyment in knowing what we did not know before; and this pleasure is greatly increased when the information is such as excites our surprise, wonder or admiration. Most persons who take delight in reading tales of ghosts, which they know to be false, and feel

all the while to be silly in the extreme, are merely gratified, or rather occupied, with the strong emotions of horror excited by the momentary belief, for it can only last an instant. Such reading is a degrading waste of precious time, and has even a bad effect upon the feelings and the judgment. But true stories of horrid crimes, as murders, and pitiable misfortunes, as shipwrecks, are not much more instructive. It may be better to read these than to sit yawning and idle—much better than to sit drinking or gaming, which, when caried to the least excess, are crimes in themselves, and the fruitful parents of many more. But this is nearly as much as can be said for such vain and unprofitable reading. If it be a pleasure to gratify curiosity, to know what we were ignorant of, to have our feelings of wonder called forth, how pure a delight of this very kind does Natural Science hold out to its students? Recollect some of the extraordinary discoveries of Mechanical Philosophy. How wonderful are the laws that regulate the motions of fluids! Is there any thing in all the idle books of tales and horrors more truly astonishing than the fact, that a few pounds of water may, by mere pressure, without any machinery, by merely being placed in a particular way, produce an irresistible force? What can be more strange, than that an ounce weight should balance hundreds of pounds, by the intervention of a few bars of thin iron? Observe the extraordinary truths which Optical Science discloses. Can any thing surprise us more, than to find that the color of white is a mixture of all others—that red, and blue, and green, and all the rest, merely by being blended in certain proportions, form what we had fancied rather to be no color at all, than all colors together? Chemistry is not behind in its wonders. That the diamond should be made of the same material with coal; that water should be chiefly composed of an inflammable substance; that acids should be almost all formed of different kinds of air, and that one of those acids, whose strength can dissolve almost any of the metals, should be made of the self-same ingredients with the common air we breathe; that salts should be of a metallic nature and composed, in great part, of metals, fluid like quicksilver, but lighter than water, and which, without any heating, take fire upon being exposed to the air, and, by burning, form the substance so abounding in saltpetre and in the ashes of burnt wood: these, surely, are

things to excite the wonder of any reflecting mind—nay, of any one but little accustomed to reflect. And yet these are trifling when compared to the prodigies which Astronomy opens to our view: the enormous masses of the heavenly bodies; their immense distances; their countless numbers, and their motions, whose swiftness mocks the uttermost efforts of the imagination.

To trace unexpected resemblances is, indeed, the object of all philosophy; and experimental science in particular is occupied with such investigations, giving us general views, and enabling us to explain the appearances of nature, that is, to show how one appearance is connected with another. But we are now only considering the gratification derived from learning these things. It is surely a satisfaction, for instance, to know that the same thing, or motion, or whatever it is, which causes the sensation of heat, causes also fluidity, and expands bodies in all directions; that electricity, the light which is seen on the back of a cat when slightly rubbed on a frosty evening, is the very same matter with the lightning of the clouds;—that plants breathe like ourselves, but differently by day and by night;—that the air which burns in our lamps enables a balloon to mount, and causes the globules of the dust of plants to rise, float through the air, and continue their race;—in a word, is the immediate cause of vegetation. Nothing can at first view appear less like, or less likely to be caused by the same thing, than the processes of burning and of breathing,—the rust of metals and burning,—an acid and rust,—the influence of a plant on the air it grows in by night, and of an animal on the same air at any time, nay, and of a body burning in that air; and yet all these are the same operation. It is an undeniable fact, that the very same thing which makes the fire burn, makes metals rust, forms acids, and causes plants and animals to breathe; that these operations, so unlike to common eyes, when examined by the light of science, are the same,—the rusting of metals,–the formation of acids,–the burning of inflammable bodies,—the breathing of animals,—and the growth of plants by night. To know this is a positive gratification. Is it not pleasing to find the same substance in various situations extremely unlike each other; to meet with fixed air as the produce of burning,—of breathing,—and of vegetation;—to find that it is the choak-damp of mines,—the bad air in the grotto at Naples,—the cause of death in the neglected brewers' vats,— and of the brisk and acid flavor

of Seltzer and other mineral-springs? Nothing can be less like than the working of a vast steam-engine, and the crawling of a fly upon the window. We find that these two operations are performed by the same means, the weight of the atmosphere, and that a sea-horse climbs the ice-hills by no other power. Can any thing be more strange to contemplate? Is there in all the fairy tales that ever were fancied any thing more calculated to arrest the attention and to occupy and to gratify the mind, than this most unexpected resemblance between things so unlike to the eyes of ordinary beholders? What more pleasing occupation than to see uncovered and bared before our eyes the very instrument and the process by which nature works? Then we raise our views to the structure of the heavens; and are again gratified with tracing accurate but most unexpected resemblances. Is it not in the highest degree interesting to find, that the power which keeps this earth in its shape, and in its path, wheeling round the sun, extends over all the other worlds that compose the universe, and gives to each its proper place and motion; that this same power keeps the moon in her path round our earth, and our earth in its path round the sun, and each planet in its path; that the same power causes the tides upon our earth, and the peculiar form of the earth itself; and that, after all, it is the same power which makes a stone fall to the ground? To learn these things, and to reflect upon them, fills the mind, and produces certain as well as pure gratification.

One of the most gratifying treats which science affords us is the knowledge of the extraordinary powers with which the human mind is endowed. No man, until he has studied philosophy, can have a just idea of the great things for which Providence has fitted his understanding, the extraordinary disproportion which there is between his natural strength and the powers of his mind, and the force which he derives from those powers. When we survey the marvellous truths of Astronomy, we are first of all lost in the feeling of immense space, and of the comparative insignificance of this globe and its inhabitants. But there soon arises a sense of gratification and of new wonder at perceiving how so insignificant a creature has been able to reach such a knowledge of the unbounded system of the universe—to penetrate, as it were, through all space, and become familiar with the laws of nature at distances so enormous as baffle our imagination

—to be able to say, not merely that the Sun has 326,630 times the quantity of matter which our globe has, Jupiter 308 $\frac{9}{10}$, and Saturn 93½ times; but that a pound of lead weighs at the Sun 22 lbs. 15 ozs. 16 dwts. 8 grs. and ¾ of a grain; at Jupiter 2 lbs. 1 oz. 19 dwts. 1 gr. $\frac{2}{3}$ $\frac{9}{3}$; and at Saturn 1 lb. 3 ozs. 8 dwts. 20 grs. $\frac{1}{11}$ part of a grain; and what is far more wonderful, to discover the laws by which the whole of this vast system is held together and maintained through countless ages in perfect security and order. It is surely no mean reward of our labor to become acquainted with the prodigious genius of those who have almost exalted the nature of man above its destined sphere; and, admitted to a fellowship with those loftier minds, to know how it comes to pass that by universal consent they hold a station, apart, rising over all the Great Teachers of Mankind, and spoken of reverently, as if NEWTON and LAPLACE were not the names of mortal men.

The highest of all our gratifications in the contemplations of science remains: we are raised by them to an understanding of the infinite wisdom and goodness which the Creator has displayed in all his works. Not a step can we take in any direction without perceiving the most extraordinary traces of design; and the skill every where conspicuous is calculated in so vast a proportion of instances to promote the happiness of living creatures, and especially of ourselves, that we can feel no hesitation in concluding, that if we knew the whole scheme of Providence, every part would be in harmony with a plan of absolute benevolence. Independently, however, of this most consoling inference, the delight is inexpressible of being able to follow, as it were, with our eyes, the marvellous works of the Great Architect of Nature, to trace the unbounded power and exquisite skill which are exhibited in the most minute, as well as the mightiest parts of his system. The pleasure derived from this study is unceasing, and so various, that it never tires the appetite. But it is unlike the low gratifications of sense in another respect: it elevates and refines our nature, while those hurt the health, debase the understanding, and corrupt the feelings; it teaches us to look upon all earthly objects as insignificant, and below our notice, except the pursuit of knowledge and the cultivation of virtue—that is to say, the strict performance of our duty in every relation of society; and it gives a dignity and importance to the enjoyment of life which the frivolous and grovelling cannot even comprehend.

GREEN MOUNTAIN REPOSITORY.

BURLINGTON, DECEMBER, 1832.

The period for which we pledged the continuance of the Green Mountain Repository is now elapsed. We had fondly hoped that this little work would have survived the first year of its existence—that the contributions and patronage of our fellow citizens would have enabled us to continue and improve it, and make it not only instructive and useful, but at the same time creditable to the arts and literature of the state. But our anticipations have not been realized; and in taking our leave of our few, *very few*, patrons, we shall, agreeably, to our promise, glance retrospectively at the year, which has now passed over our heads, and whose events are registered and sealed for eternity.

At the commencement of the year, we were contemplating at a distance and with wonder, that mysterious pestilence, the *Cholera*, which was then ravaging the cities of Europe, and we were then felicitating ourselves upon the salubrity of our clime, and our exemption from disease. But a few months, however, elapsed before it bestrode the Atlantic and began the work of death upon the American shores. From Quebec, where its ravages first commenced, it passed like a blighting whirlwind over our land;—touching but lightly upon some portions, but bearing heavily upon others. The aggregate number of victims in four cities, viz. Quebec, Montreal, New York and New Orleans, was not less than 10,000. In some other towns it was nearly as fatal in proportion to the population; but Vermont, in the good providence of God, has hitherto escaped this fell destroyer, with the exception of some eight or ten cases along the shores of lake Champlain.

The seasons. As we have published a meteorological journal for the whole year, we must refer our readers to that for particular information upon this subject. Only two months have differed much from their usual temperature. The months of May and June, were some degrees colder than usual. In consequence of this the growth of vegetation was much retarded and the productions of the earth much diminished. The crops of grain and corn particularly the latter, were much lighter than usual.

Politics. Calumny and abuse, the usual implements of demagogues, have not been sparingly used the present year, though perhaps they have not been quite so highly charged with venom as on some former occasions. One of the most tediously contested elections was that for representatives to congress from the fourth district. At the 11th trial, and after the death of Mr Bailey one of the candidates, Mr Allen the national republican candidate was elected.

The Vermont Legislature assembled at Montpelier on the 11th of October. The election sermon was preached by Rev. William S. Perkins of Arlington. On canvassing the votes it was found that no governor was elected by the people. The votes stood as follows.

For William A. Palmer,	*(Anti-masonic)*	17181.
Samuel C. Crafts,	*(National Republican)*	15429.
Ezra Meech,	*(Jackson)*	8210.

After a trial for several days, Mr Palmer was elected by the legislature at the 43 balloting by a majority of two votes.

In addition to the usual business of the session, was the election of senator to Congress, in place of Mr Seymour, and the making provision for the erection of a new state house. The choice of senator resulted in the election of Benjamin Swift. The joint ballot of both houses was as follows.

B. Swift, - - - - - -	129.
O. C. Merrill, - - - - -	43.
C. K. Williams, - - - - -	26.
Wm. Slade, - - - - - -	10.
Scattering, - - - , -	10.

Burlington and vicinity, having offered the state $30,000, towards the erection of a new state house, provided the seat of government should be removed to Burlington, the disposal of this subject gave rise to considerable debate; it was however finally decided by a vote of 111 to 86, to continue the seat of government at Montpelier, that town pledging itself to pay $15,000 towards the erection of a new house.

The election of electors of president and vice president, which took place in November, resulted in the choice of the whole of the antimasonic ticket, and they gave their votes for William Wirt, president, and Amos Ellmaker, vice president.

Ecclesiastical. We have not the means of particularizing the proceedings of the different religious associations in our state during the past year. We believe, however, that these proceedings have been generally marked by unanimity of sentiment and action, and that they have been characterized rather by a desire to promote the cause of piety and religion, than a wish to increase sectarian jealousies and animosities.

Episcopal Church in Vt. The Convention of the Protestant Episcopal Church in Vt., assembled at Middlebury, on the 30th day of May, and, having obtained the consent of the general convention of the Eastern Diocess, and of the conventions of the several states composing the same, they withdrew from their connexion with said diocess, and declared Vt. to be a distinct Episcopal jurisdiction, under the name of the Diocess of Vermont. They then proceeded to the election of a Bishop and made choice of the Rev. John H. Hopkins, who, having signified his acceptance was consecrated in the city of New York on the 31st day of October, during the session of the General Convention of the Protestant Episcopal Church in the United States, and entered upon his duties as diocesan bishop, and Rector of St Paul's Church, Burlington, on the 11th of November. The following table shows the location and num. of parishes represented in the last convention of Vt., together with the Rectors, and the number of communicants in the parishes from which returns were received.

Location.	*Name.*	*Rector.*	*Commu.*
Arlington,	St James',	Rev. William S. Perkins.	112
Berkshire,	Calvary,	Rev. Richard Peck.	114
Bethel,	Christ,	Rev. James Sabine.	90
Bellows Falls,	Immanuel,	Rev. Carlton. Chase.	60
Burlington,	St Paul's,	Rt. Rev. John H. Hopkins.	48
Fairfield,	Trinity,		91
Guilford,	Christ,	Rev. Jacob Pierson.	
Manchester,	Zion,	Rev. Abraham Bronson.	62
Middlebury,	St Stephen's,	Rev. Silas A. Crane.	49
Milton,	Trinity,		
Montgomery,	Union,	Rev. Richard Peck.	72
Pawlet,	Trinity,		29
Perkinsville,	St John's,		
Poultney,	St John's,	Rev. Moore Bingham.	40
Rutland,	Trinity,	Rev. John A. Hicks.	17
Shelburn,	Trinity,	Rev. Louis Mc Donald	74
Sheldon,	Grace,	Rev. Anson B. Hard.	91
St Albans,	Union,	Rev. Sylvester Nash.	58
Wells,	St Paul's,		22
Windsor,	St Paul's,	Rev. William Horton.	58
Woodstock,	St James',	Rev. Benj. C. C. Parker	25
Vergennes,	St Paul's,		
Springfield,	Union,		

METEOROLOGICAL

BURLINGTON, Vt., Lat. 44° 27′. Long. 73° 14′. Altitude above Lake

1832.		*Thermometer.*			*Barometer.*			RAIN	*Winds.*		
DEC		S. R.	1P.M.	9 EV.	S. R.	1 P.M.	9 EV.	Inch's	Morning.	Noon.	Evening.
1	7	20	18	16	29.20	29.30	29.85	.81	N.	N.	N.
2	G	14	21	14	29.90	29.90	29.65	.42	N.	N.	N.
3	2	24	34	31	29.45	29.30	29.25		S.	S.	S. W.
4	3	29	30	24	29.20	29.50	29.70		N. W.	N. W.	N.
5	4	12	21	11	30.00	30.10	30.10		N.	N.	N.
6	5	22	30	29	30.00	30.00	30.00		S.	S.	S.
7	6	25	30	31	30.10	29.90	29.75	.09	S.	S.	S.
8	7	37	41	36	29.50	29.35	29.25		S.	S.	S.
9	G	34	38	36	29.10	29.10	29.20		N.	N.	N.
10	2	28	33	32	29.50	29.40	29.45		N.	N.	N.
11	3	33	42	36	29.50	29.45	29.40		S.	S.	S.
12	4	32	25	18	29.35	29.30	29 55		N.	N.	N.
13	5	14	20	21	29.70	29.70	29.75	.10	N.	N.	N. E.
14	6	32	32	24	29.70	29.65	29.60		S.	S.	N.
15	7	25	24	22	29.60	29.60	29.60		S.	N.	N.
16	G	22	27	27	29.60	29.55	29.50		S.	S.	S.
17	2	31	36	32	29.25	29.10	28.70		S. E.	S. E.	S. E.
18	3	26	29	29	28.50	28.50	29.60	.74	N. W.	N.	N.
19	4	19	24	17	28.70	28.70	28.90		W.	N.	N.
20	5	12	18	7	29.10	29.10	29.30		N.	N.	N.
21	6	—1	20	9	29.30	29.35	29.35		N.	N.	N. E.
22	7	6	19	8	29.55	29.55	29.60		N.	N.	N.
23	G	11	16	8	29.75	29.75	29.75		N.	S.	S.
24	2	10	20	22	29.90	29.75	29.70		S.	S.	S.
25	3	28	34	24	29.50	29.60	29.85		S.	W.	N.
26	4	22	15	20	29.90	30.00	29.50		N.	N.	S.
27	5	29	37	34	29.30	29.20	29.10	.11	S.	S.W.	S. W.
28	6	15	16	6	29.45	29.60	29.80		N. W.	N.	N.
29	7	10	17	3	29.85	30.00	30.20		N.	N.	N.
30	G	—3	19	21	30.30	30.20	30.05		N. W.	S′.	S′.
31	2	30	36	40	28.85	29.70	29.55		S″.	S″.	S″.
MEAN		21	27.5	22.2	29.53	29.51	29.54	2.27	Gen'l mean Ther. 23.6		

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Champlain 250 feet. Distance from the Lake, one mile East.

D.	Weather. Morn.	Noon.	Even'g.	Remarks.
1	*Snow*	*Snow*	*Fair*	Snow in the last 36 hours about 1. [inches.
2	*Clear*	*Hazy*	*Hazy*	
3	*Cloudy*	*Cloudy*	*Fair*	
4	*Cloudy*	*Cloudy*	*Snow*	
5	*Fair*	*Clear*	*Clear*	
6	*Cloudy*	*Cloudy*	*Cloudy*	
7	*Cloudy*	*Clear*	*Cloudy*	
8	*Cloudy*	*Cloudy*	*Cloudy*	Foggy. Streets begin to be wet.
9	*Cloudy*	*Cloudy*	*Clear*	Very foggy and wet.
10	*Cloudy*	*Fair*	*Clear*	Snow nearly gone—sleighing quite [gone.
11	*Clear*	*Clear*	*Clear*	
12	*Cloudy*	*Cloudy*	*Cloudy*	Snow and hail.
13	*Cloudy*	*Cloudy*	*Cloudy*	Sleighs run again.
14	*Cloudy*	*Cloudy*	*Cloudy*	Foggy
15	*Cloudy*	*Cloudy*	*Cloudy*	
16	*Cloudy*	*Cloudy*	*Cloudy*	Trees beautifully loaded with frozen [mist.
17	*Snow*	*Snow*	*Snow*	
18	*Snow*	*Cloudy*	*Cloudy*	
19	*Cloudy*	*Cloudy*	*Clear*	
20	*Clear*	*Clear*	*Clear*	
21	*Fair*	*Cloudy*	*Clear*	Thermometer below zero for the [first time.
22	*Cloudy*	*Cloudy*	*Cloudy*	
23	*Cloudy*	*Cloudy*	*Clear*	
24	*Cloudy*	*Clear*	*Cloudy*	
25	*Cloudy*	*Cloudy*	*Cloudy*	
26	*Clear*	*Clear*	*Cloudy*	Snow.
27	*Cloudy*	*Snow*	*Cloudy*	
28	*Cloudy*	*Fair*	*Clear*	
29	*Fair*	*Clear*	*Clear*	Sleighing good all this month excepting three days, from the 9th to the 12th.
30	*Clear*	*Clear*	*Clear*	
31	*Fair*	*Fair*	*Fair*	

Barometer, 29.53 inches.

METEOROLOGICAL OBSERVATIONS FOR THE YEAR 1832.

BURLINGTON, Vt. Lat. 44 deg. 27 min., Long. 73 deg. 14 min.—Altitude of the place of observation, above lake Champlain 250 feet. Distance from the Lake one mile east.

	THERMOMETER.					BAROMETER.					WINDS.								WEATH.			1828.		1803-8
MONTHS 1832.	Mean Tem.	Greatest Heat.	Least Heat.	Warmest Day.	Coldest Day.	Mean Height.	Grt'st Height.	Least Height.	Range.	W'ter in inch's	N	N E	E	S E	S	S W	W	N W	Fair.	Cloudy.	R'n or Snow.	W'ter in inch's.	Mean Temp.	Mean Temp.
JANUARY.	19.7	48	–16	19	26	29.62	30.20	29.00	1.2	3.56	5	1	0	1	13	1	4	6	16	15	6	1.30	25.0	14.4
FEB.	19.3	42	–12	15	24	29.74	30.45	29.10	1.3	3.22	12	0	1	0	12	1	1	2	14	15	7	2.10	31.1	18.9
MARCH.	30.8	62	—1	25	1	29.50	30.20	28.85	1.3	2.31	13	0	0	1	14	0	1	2	20	11	6	1.35	32.4	28.5
APRIL.	39.4	72	14	26	8	29.43	30.00	28.75	1.3	1.96	13	1	0	2	8	2	1	3	19	11	7	2.75	39.2	39.5
MAY.	52.4	85	31	13	6	29.30	29.90	28.70	1.2	5.71	14	0	1	1	10	0	2	3	20	11	1	2.45	57.6	56.3
JUNE.	61.3	88	40	26	4	29.05	29.60	28.60	1.	3.41	14	0	0	1	12	0	1	2	22	8	9	3.70	69.7	66.6
JULY.	68.5	91	50	2	13	29.05	29.40	28.40	1.	3.52	10	1	1	0	15	1	1	2	20	11	11	5.95	70.1	68.2
AUGUST.	68.3	84	45	15	25	29.07	29.45	28.60	.9	4.76	6	0	0	0	22	1	0	2	24	7	8	4.30	70.2	67.6
SEPT.	58.7	82	43	19	13	29.19	29.65	28.85	.8	1.81	5	0	0	0	17	1	4	3	24	6	4	9.85	60.8	57.1
OCT.	47.7	65	21	20	26	29.41	30.10	28.80	1.3	4.05	7	0	0	1	17	1	1	4	18	13	9	1.65	46.7	45.2
NOV.	35.6	61	13	1	15	29.45	30.05	28.90	1.1	3.01	7	1	0	0	13	1	4	4	12	18	9	6.25	38.9	33.5
DEC.	23.6	42	—3	11	21	29.53	30.30	28.50	1.8	2.27	15	1	0	1	11	1	1	1	11	20	6	1.65	29.3	27.7
RESULTS.	43.6					29.36				39.59	121	5	3	8	164	10	21	34	220	146	93	43.30	47.6	43.4

By the foregoing table, it appears that the mean temperature of the year 1832, was 43.6 degrees, which differs only two tenths of a degree from the mean temperature from 1803 to 1808, according to the observations of Doctor Saunders, but 4 degrees colder than the year 1828. The Thermometer has varied from 91 degrees to —16, equal 107 degrees.

The mean height of the Barometer was 29.36 inches, which is .19 inch greater than in 1828.[1] The range of the Barometer was from 28.40 to 30.45, equal to 2.05 inches. The quantity of water fallen in rain and snow, was 39.59 inches, which is 3.71 inches less than the quantity in 1828. The figures in the column under *Winds* and *Weather*, in the table, denote the number of days, by which it appears that the wind was N. 121 days, N. E. 5, E. 3, S. E. 8, S. 164, S. W. 10, W. 21, and N. W. 34. The weather has been fair 220 days, and cloudy with or without rain or snow, 146 days. Not only the clear days, but those in which there have been some clouds, if there was no immediate prospect of a storm, have been denoted as fair.

Sleighing was good at Burlington, 26 days in January, 29 days in February, 22 days in March, 5 days in November, and 27 days in December, amounting in the whole to 109 days, equal to 15½ weeks. The whole depth of snow in the year, measured immediately after it fell, was about 8 feet.

The Aurora Borealis has been observed twelve nights; several of the times very brilliant. It has usually exhibited the form of concentric arches over the northern point of the horizon. It was most frequent in the month of October. Showers with thunder and lightning were frequent during the summer months, but no severe tempests.

Remarks on the Journal Dec.-By the foregoing table, it appears that the mean temperature of December, 1832, was 23.6 degrees, which is 5.7 degrees colder than December, 1828; and 1.1 degree colder than the mean of Doctor Saunders' observation. Range of the Thermometer from 3 degrees below zero to 42 above, equal to 45 degrees. Mean height of the Barometer, 29.53 inches, range of the Barometer from 28.50 to 30.30, equal to 1.8 inch.

SOLUTION OF THE QUESTION IN NO. 11.

If we suppose 1 to be the content of the cone, $\frac{1}{3}$ and $\frac{2}{3}$, will be the parts cut off. Then as $1 : 20 \times 20 \times 20 = 8000 : \frac{1}{3} : 2666\frac{2}{3}$, and $\sqrt[3]{2666\frac{2}{3}} = 13.86+$ which is the height of the upper part, and $1 : 8000 : : \frac{2}{3} : 5333\frac{1}{3}$, and $\sqrt[3]{5333\frac{1}{3}} = 17.47$ inches, the height of the two upper parts: then $17.47 - 13.76 = 3.61$ height of the middle part and $20 - 17.47 = 2.53$ height of the lower part.

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POETICAL DEPARTMENT.

TO THE DYING YEAR.

Thou desolate and dying year!
Emblem of transitory man,
Whose wearisome and wild career,
Like thine is bounded to a span;
It seems but as a little day
Since nature smil'd upon thy birth,
And Spring came forth in fair array,
To dance upon the joyous earth.

Sad alteration—now how lone—
How verdureless is nature's breast,
Where ruin makes his empire known,
In Autumn's yellow vesture drest;
The sprightly bird whose carol sweet
Broke on the breath of early day—
The summer flowers she loved to greet—
The bird—the flowers—Oh, where are they?

Thou desolate and dying year!
Since Time entwin'd thy vernal wreath,
How often Love hath shed the tear
And knelt beside the bed of death:
How many hearts that lightly sprung
When Joy was blooming but to die,
Their finest chords by death unstrung,
Have yielded life's expiring sigh,

And pillow'd low beneath the clay,
Have ceased to melt, to breathe, to burn—
The proud—the gentle and the gay
Gather'd unto the mouldering urn—
Whilst freshly flowed the frequent tear
For love bereft—affection fled—
For all that were our blessings here,
The lov'd—the lost—the sainted dead!

Promise of youth! fair as the form
Of Heaven's benign and golden bow,
Thy smiling arch begirds the storm,
And sheds a light on every woe;
Hope wakes for thee, and to her tongue,
A tone of melody is given,
As if her magic voice were strung
With the empyrean fire of heaven.

Thou desolate and dying year!
Prophetic of our final fall,
Thy buds are gone—thy leaves are sear,
Thy beauties shrouded in the pall;
And all the garniture that shed
A brilliancy upon thy prime,
Hath, like a morning vision, fled
To the expanded grave of Time.

Time! time! In thy triumphant flight
How all life's phantoms fleet away—
The smile of hope, and young delight,
Fame's meteor beam, and fancy's ray,
They fade—and on thy heaving tide
Rolling its stormy waves afar,
Are borne the wrecks of human pride
The broken wrecks of fortune's war.

There in disorder, dark and wild
Are seen the fabrics once so high,
Which mortal vanity had piled
As emblems of Eternity!

Oh! thus hath life its even-tide
Of sorrow—loneliness—and grief—
And thus divested of its pride
It withers like the yellow leaf:
Oh, such is life's autumnal bower
When plunder'd of its summer bloom—
And such is life's autumnal hour
Which heralds man unto the tomb. *Florio.*

[From "The Knickerbacker" for January.]

THE ARCTIC LOVER TO HIS MISTRESS.

BY WILLIAM C. BRYANT.

Gone is the long, long winter night,
Look, my beloved one!
How glorious, through his depths of light,
Rolls the majestic sun!
The willows, waked from winter's death,
Give out a fragrance like thy breath—
The summer is begun!

Aye, 'tis the long bright summer day.
Hark to that mighty crash!
The loosened ice-ridge breaks away—
The smitten waters flash.
Seaward the glittering mountain rides,
While down its green translucent sides,
The foamy torrents dash.

See love my boat is moored for thee,
By ocean's weedy floor—
The petrel does not skim the sea
More swiftly than my oar.
We'll go where on the rocky isles,
Her eggs the screaming sea-fowl piles
Beside the pebbly shore.

Or, bide thee where the poppy blows,
With wind-flowers frail and fair,
While I, upon his isle of snows,
Seek and defy the bear.
Fierce though he be, and huge of frame,
This arm his savage strength shall tame,
And drag him from his lair.

When crimson sky and flamy cloud
Bespeak the summer fled,
And snows that melt no more, enshroud
The vallies white and dead,
I'll build of ice thy winter home,
With glistening walls and lucid dome,
And floor with skins bespread.

The white fox by thy couch shall play;
And, from the frozen skies,
The meteors of a mimic day
Shall flash upon thine eyes.
And I—for such thy vow—meanwhile,
Shall hear thy voice and see thy smile,
Till that long midnight flies.